



Australian Government

Department of Education, Employment and Workplace Relations

MEM18097A Manufacture cavity dies

Release: 1

MEM18097A Manufacture cavity dies

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing to manufacture and manufacturing cavity dies including matching use of hand and hand held power tools, assembly of the tooling components and trialling the tooling.
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Application of the Unit

Application of the unit	This unit includes the skills required to manufacture and trial all types of production tooling. Work is undertaken autonomously or in a team environment. The tooling being produced may include, but is not limited to, the following types:; forging dies, extruding dies, die casting (high and low pressure and gravity feed), plastic moulds (injection, compression, blow and foam) and glass moulds or dies requiring precision manufacture. A normal range of tool room equipment would be used which may include lathes, mills, copy/duplicator, grinders, EDM and wire cut equipment, precision measurement, hand and power tools. Where simple welding or brazing skills are required, see Units MEM05012C (Perform routine manual metal arc welding) and Unit MEM05006B (Perform brazing and/or silver soldering). Where manufacture of press tools and gauges is required, unit MEM18014B (Manufacture press tools and gauges) should be selected. Band: A Unit Weight: 8
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM06007B	Perform basic incidental heat/quenching, tempering and annealing
	MEM07005C	Perform general machining
	MEM07006C	Perform lathe operations
	MEM07007C	Perform milling operations
	MEM07008D	Perform grinding operations
	MEM09002B	Interpret technical drawing
	MEM12003B	Perform precision mechanical measurement
	MEM12006C	Mark off/out (general engineering)
	MEM12023A	Perform engineering measurements
	MEM12024A	Perform computations
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work
	MEM18006C	Repair and fit engineering components
	MEM18015B	Maintain tools and dies
	MEM18055B	Dismantle, replace and assemble engineering components
	MEM30012A	Use mathematical techniques and perform simple statistical computations

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare to manufacture cavity die	1.1. Tooling requirements are determined from customer's components drawings, prints or sample component. 1.2. Tooling type and design are conceptualised and planned with reference to customer's specifications (written or verbal) for numbers, finish, quality and material. 1.3. Production machine to be used to produce components is assessed and considered in tooling design. 1.4. Tool design is interpreted and visualised from tooling drawings, prints or plan and checked against customer requirements. 1.5. Selected production machine mounting requirements are determined to ensure any special or additional provisions are incorporated in tooling design.
2. Manufacture tooling	2.1. Appropriate materials are selected and obtained to meet tooling requirements for strength, durability, component finish, heat treatment qualities where necessary and accounting for materials availability. 2.2. Selected material is tested for hardness as appropriate to aid selection of machine tools, hand tools and hand held power tools to be used to fashion or shape tooling components. 2.3. Plan is developed to sequence and stage manufacturing process, including establishing datum, mark out, rough out (machine or fashion), stress relieve/heat treat, finish size, fashion and fit and assemble componentry.
3. Perform machining operations	3.1. Appropriate machines and machining process are selected from a range of standard tool room machines to shape/produce tooling components to specifications.
4. Use hand and hand held power tools	4.1. A range of hand and hand held power tools are selected and used to fashion/manufacture tooling components to specification. 4.2. Where practical, components sample or section is produced for testing.
5. Assemble tooling components	5.1. Using acceptable tool making techniques and procedures, components are checked and fitted/assembled correctly to specifications.

ELEMENT	PERFORMANCE CRITERIA
6. Trial tooling	6.1. First-off component is checked with precision instruments against specification. 6.2. Tooling is modified as necessary to produce components to specification. 6.3. Modified tooling is re-trialled and component is produced. 6.4. Conformance to specification is verified and reported according to standard operating procedures. 6.5. Where necessary, all deviations or modifications to original tooling design, prints or plans are recorded and reported according to standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- obtaining and interpreting relevant drawings, prints and/or sample components, specifications and instructions
- sketching or drawing the tool design
- incorporating mounting requirements into tooling design
- testing tooling materials for hardness
- preparing sequential plan for the manufacture of the required tooling
- shaping/producing tooling components to specifications using appropriate machines and machining processes
- using hand and hand held power tools to fashion/ manufacture tooling components to specification
- assembling and fitting tooling components using acceptable tool making techniques and procedures
- producing first-off component/product
- checking first-off component/product for conformance to specification
- modifying tooling using appropriate tool making techniques and procedures
- checking conformance of the component/product to specifications
- recording/reporting modifications or alterations to original tooling design

REQUIRED SKILLS AND KNOWLEDGE**Required knowledge**

Look for evidence that confirms knowledge of:

- customers' tooling requirements
- the type of tooling to be manufactured
- the machine(s) in which the tooling is to be used
- the tooling design concept in terms of customer specifications and proposed production machine(s)
- the performance requirements of the tooling
- the method of mounting the tooling in the production machine into which it is to be installed
- the physical properties of a range of tool steels
- the appropriate materials for each component of the tooling to be produced
- the reasons for selecting the chosen materials in terms of: strength, durability, component finish, heat treatment requirements, and availability
- the procedures for hardness testing materials
- the effect of material hardness on machinability of the material
- the appropriate machinery and tools to be used to fashion or shape tooling components
- the reasons for selecting the chosen machinery and tooling
- the reasons for establishing a sequential plan for the manufacture of tooling
- the procedures for documenting plans for the manufacture of tooling
- the hand and hand held power tools to be used to fashion/manufacture the required tooling components
- the reasons for selecting the chosen hand and hand held power tools
- procedures for fitting/assembling the tooling components
- the precautions to be taken when fitting/assembling tooling components
- the appropriate precision instruments for checking the components produced
- the specifications of the finished product
- causes of any non-conformance to specification
- the tool making techniques/procedures to be applied to return the tooling to specification
- procedures for reporting/recording the conformance of the component/product produced by the tooling to specifications
- procedures for recording/reporting modifications and/or alterations to tooling design
- hazards and control measures associated with the manufacture of tools, including housekeeping
- safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

A person who demonstrates competency in this unit must be able to manufacture cavity dies. Competency in this unit cannot be claimed until all prerequisites have been satisfied.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Context of and specific resources for assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with cavity die manufacture or other units requiring the exercise of the skills and knowledge covered by this unit.

Method of assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Guidance information for

EVIDENCE GUIDE**assessment****Range Statement****RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Tooling

Forging dies, extruding dies, die casting (high and low pressure and gravity feed), plastic moulds (injection, compression, blow and foam) and glass moulds or dies requiring precision manufacture

Unit Sector(s)**Unit sector****Co-requisite units****Co-requisite units**

Competency field

Competency field	Maintenance and diagnostics
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